CLAIMS

What is claimed is:

1. An automation system for batch processing, comprising:

at least one material model to describe one or more components of a recipe, the recipe manufactured by an industrial control system having associated automation components; and

at least one process model executable by the industrial control system, the material model drives the process model to dynamically select a subset or a portion of the automation components in order to manufacture the recipe.

2. The system of claim 1, the material model is dynamically mapped to the process model in accordance with real time process operations associated with one or more automated production stages, the automated production stages including at least one of a raw inventory stage, a production stage, a packing stage, and a final production stage.

3. The system of claim 2, the mapping facilitates automatically selecting at least one of available equipment, containers, and materials at run-time based upon one or more attributes of the materials as described in the material model.

4. The system of claim 1, the process model includes at least one of programs, batch executables for controlling equipment, function charts, function blocks, and ladder logic executable by the industrial control system.

5. The system of claim 2, further comprising at least one of an upstream control and a downstream control for interacting with the automated production stages.

6. The system of claim 1, the material model is associated with an Enterprise Resources Planning (ERP) database that is automatically updated in accordance with model activities.

7. The system of claim 1, further comprising an area model which provides a mapping between logical material requirements specified in the material model and equipment employed to manufacture batches from the components of the recipe.

8. The system of claim 7, the area model includes a phase mapping between requested materials from the material model and the equipment.

9. The system of claim 8, the phase mapping includes one or more parameters that control a material amount to at least one of add to and distribute materials from a selected process.

10. The system of claim 7, further comprising at least one of a material server and a batch server to coordinate operations between the material model and the process model.

11. The system of claim 10, the material model and the area model are bound at runtime of a recipe in accordance with at least one of static, dynamic, creation, automatic, prompted, and manual binding procedures.

12. The system of claim 11, the binding procedures occur across a network including at least one of a factory network and a public network.

13. The system of claim 12, the network includes access to at least one of an Internet, an Intranet, and an automation network, the automation network including at least one of a Control and Information Protocol (CIP) network, a DeviceNet network, a ControlNet network, an Ethernet network, TCP/IP network, a Fieldbus network, a Modbus network, a Profibus network, and a wireless network.

14. The system of claim 1, the automation components include at least one of a control, a communications module, a computer, an I/O device, a Human Machine Interface (HMI), a Programmable Logic Controller (PLC), and an Input/Output module.

15. The system of claim 1, further comprising a user interface to provide at least one of an inventory manager, a material editor, a recipe editor, and an equipment editor.

16. The system of claim 1, at least one of the material model and the process model employ at least one of an Active X control, a Component Object Model (COM) interface, Distributed COM (DCOM) interface, a COM+ interface, a CORBA interface, and a .NET interface to facilitate communications between the models.

17. The system of claim 10, at least one of the material server and the batch server include access and storage capabilities with a database, the database including at least one of Structured Query Language (SQL) database, an XML database, and an SQLXML database.

18. The system of claim 1, the material model is implemented as an object having one or more components, the components including at least one of a material state, a material type, a material class, a material list, a container, a lot, and a sublot.

19. The system of claim 18, at least one of the components of the object inherit properties from at least one other component.

20. A material reservation method for industrial automation systems, comprising:

associating recipe materials with a model;

linking the model to an industrial control process; and

employing the model to determine equipment within the industrial control process to manufacture the recipe.

21. The method of claim 20, further comprising associating the model with an inventory database.

22. The method of claim 20, the linking further comprising binding the recipe materials to an area model, the area modal including at least one of a unit and an equipment module.

23. The method of claim 22, the binding further comprising at least one of unit binding and recipe-phase binding.

24. The method of claim 22, further comprising linking the model to a material-enabled phase within the industrial control process.

25. The method of claim 24, the material-enabled phase includes at least one of selecting a material, selecting a material class, selecting a container, selecting the unit, selecting the equipment module, adding material to the container, and distributing material from the container.

26. The method of claim 23, the binding further comprising at least one of manual binding, dynamic binding, and automatic binding.

27. A material reservation system for an industrial control process, comprising:

means for tracking to an inventory database having at least one material model;

means for executing an automated industrial control process in accordance with at least one attribute from the material model;

means for communicating between the inventory database and the automated industrial control process to facilitate manufacture of a recipe.

28. A computer readable medium having stored thereon a data structure for a factory automation system, comprising:

a first data field to describe material requirements of a recipe, the recipe employable in an automated industrial process;

a second data field to describe containers that store one or more materials of the recipe; and

a third data field to provide communications access to the automated industrial control process.

29. The data structure of claim 28, the third data field is an object interface.

30. The data structure of claim 28, further comprising a fourth data field that describes at least one of a material state, a material type, a material class, a lot and a sublot.

31. The data structure of claim 28, the fourth data field is automatically linked to at least one other data field having at least one of a unit designation and an equipment module designation.